

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/675,693
Filing Date: September 30, 2003
Applicants: Hui-Ling Lou et al.
Group Art Unit: 2611
Examiner: Dac V. Ha
Title: JOINT SPACE-TIME BLOCK DECODING AND
VITERBI DECODING
Attorney Docket: MP0321

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

This brief is filed in response to factual deficiencies contained in the Final Office Action of October 17, 2008 and in the Advisory Action of December 31, 2008. Claims 1-8 and 10-96 are pending in the application. Claims 92-94 stand allowable if rewritten in independent form.

Claims 1-3, 10-13, 17-21, 26-31, 35-37, 40-43, 47-52, 54-57, 61-63, 66-69, 74-76, 79-82, 89-91, and 96 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Onggosanusi (U.S. Pub. No. 2002/0196842) in view of Fang et al. (U.S. Pat. No. 5,757,834).

With respect to Claim 1, Onggosanusi and Fang do not at least show, teach or suggest: A) a dimension demultiplexer that generates components of a demodulated symbol sequence that are encoded based on a space time block (STB) code; B) a dimension demultiplexer that generates in-phase (I) and quadrature (Q) components of a demodulated symbol sequence that are encoded based on a STB code; C) a dimension demultiplexer that generates I and Q components of a demodulated symbol sequence that are encoded based on a STB code and an outer code; and D) a branch metric computation module that generates branch metrics based on the I and Q components.

With respect to feature A, the Examiner alleges that Onggosanusi discloses a demodulated sequence that is generated based on a STB code. Applicant submits that Claim 1 recites a demodulator that generates a demodulated symbol sequence that is encoded based on a STB code. The demodulated sequence generated in Onggosanusi (output of demodulator 36) is not encoded based on a STB code, but rather based on an outer code. In Onggosanusi, a received signal is STB decoded prior to demodulation by the demodulator 36. For example, in FIG. 4 of Onggosanusi, the signal received by the demodulator 36" is based on outputs of decoders 110, which decode a STB code. Thus, the outputs of the decoders 110 are not STB encoded.

With respect to features B and C, the Examiner admits that Onggosanusi does not disclose a dimension demultiplexer that generates in-phase (I) and quadrature (Q) components. The Examiner relies on Fang for the disclosure of a demodulator that generates I and Q components. The Examiner states that the

demodulator 36 and the channel decoder 40 of Onggosanusi may be replaced with the demodulator 10 and the Viterbi decoder 15 of Fang.

Regardless, of whether the devices 36 and 40 of Onggosanusi may be replaced with the devices 10 and 15 of Fang, the replacement does not provide feature B and/or feature C of Claim 1. The devices 10 and 15 of Fang demodulate and decode a signal that is outer encoded, not STB encoded. Thus, the demodulator 10 of Fang does not generate I and Q components that are encoded based on a STB code. The replacement of devices 36 and 40 with devices 10 and 15 does not change this fact, as the output of the demodulator 36 of Onggosanusi is also not encoded based on a STB code.

Thus, features A-C are not disclosed by Onggosanusi and Fang. Since features A-C are not disclosed, feature D is also not disclosed.

Features A-C of Claim 1 are beginning steps of a joint decoding process. Joint decoding refers to the conversion of an inner and outer encoded symbol sequence to an original sequence reversing the affects of both the inner and outer encoding processes during the same time period. In one aspect, joint decoding reverses the affects of a first encoding process that is based on an inner code while reversing the affects of a second encoding process that is based on an outer code.

Claim 1 explicitly states that I and Q components are encoded based on a STB code and an outer code. The separation of a demodulated symbol sequence (jointly encoded signal) into STB encoded I and Q components allows a branch metric computation module to generate one-dimensional branch

metrics. The one-dimensional branch metrics are based respectively on each of the I and Q components. A Viterbi decoder may then determine a most likely received sequence based on the one-dimensional branch metrics. The one-dimensional branch metrics are used instead of multi-dimensional branch metrics, which are common when performing separate decoding of STB encoded and outer encoded signals. The use of one-dimensional branch metrics reduces the computation complexity involved in the decoding process performed by, for example, a Viterbi decoder. Onggosanusi and Fang do not disclose steps of a joint decoding process and thus do not disclose features A-D.

On page 3 of the Advisory Action, the Examiner appears to take Official Notice in stating that the technique of Fang could have been used to produce I and Q components anywhere in a receiving chain. Applicant reminds the Examiner that according to MPEP 2144.03 Official Notice unsupported by documentary evidence should only be taken by the Examiner where the facts asserted to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. See *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970). Here, Onggosanusi does not disclose generation of I and Q components. Fang discloses the generation of I and Q components after demodulation of an outer encoded signal. The combination of Onggosanusi and Fang does not disclose the generation of I and Q components of a STB encoded signal. Thus, the features of Claim 1 would not have been obvious at least in view of Onggosanusi and Fang.

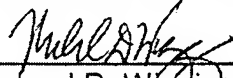
On page 5 of the Advisory Action, the Examiner appears to suggest added recitation in Claim 1 of the performance of joint decoding in a single step. Applicant submits that although such recitation would further distinguish over the relied upon references, such recitation is not necessary, since the relied upon references fail to satisfy the All Elements Rule. Applicant understands that the present application describes in detail decoding of a STB code while decoding of an outer code. However, additional recitation of the specifics of this process are not needed, as the claims already include features of this process, which are not disclosed in the relied upon references. The areas of the present application that describe this process have been pointed out to the Examiner in the Response of December 16, 2008 and have been explained in Examiner Interviews.

Therefore, Claim 1 is allowable for at least the above reasons. Claims 17, 35, 47, 61 and 73 are allowable for at least similar reasons. Claims 2-8, 10-16, 18-34, 36-46, 48-60, 62-72 and 74-96 ultimately depend from Claims 1, 17, 35, 47, 61 and 73 and are allowable for at least the same reasons.

Accordingly, Applicants respectfully submit that the pending claims are in condition for allowance.

Dated: January 16, 2009

Respectfully submitted,

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